

CLAIMS:

1. A process for selectively removing isobutene and butadiene from a stream, the process comprising contacting the stream with a hydrogenation catalyst to hydrogenate butadiene and an oligomerization catalyst to oligomerize isobutene.
2. The process of claim 1 wherein said hydrogenation catalyst includes at least one metal selected from Groups 8, 9, 10 and 11 of the Periodic Table of Elements.
3. The process of claim 2 wherein said at least one metal is selected from nickel, palladium, platinum, rhodium, ruthenium and mixtures thereof
4. The process of claim 2 wherein said hydrogenation catalyst also includes a porous inorganic oxide support.
5. The process of claim 4 wherein said porous inorganic oxide support is selected from silica, alumina, zirconia, titania, an aluminophosphate, a clay and a crystalline molecular sieve.
6. The process of claim 1 wherein said oligomerization catalyst includes a solid acid catalyst.
7. The process of claim 6 wherein said solid acid catalyst is selected from crystalline molecular sieves, substituted silicates, structured polyacids, acidified resins, mixed metal oxides and sulfated zirconia.
8. The process of claim 7 wherein said crystalline molecular sieve is selected from faujasites, ZSM-5, ZSM-11, ZSM-12, ZSM-22, ZSM-23, ZSM-34, ZSM-35, ZSM-48, ZSM-50, ZSM-57, mordenite and zeolite beta

9. The process of claim 1 wherein contacting the stream with the hydrogenation catalyst precedes contacting the stream with the oligomerization catalyst.
10. A process for selectively removing isobutene and butadiene from an olefinic stream further comprising linear butenes, the process comprising:
 - (a) contacting the olefinic stream under hydrogenation conditions with a hydrogenation catalyst to selectively hydrogenate butadiene in the olefinic stream, and
 - (b) contacting the olefinic stream under oligomerization conditions with an oligomerization catalyst to selectively oligomerize isobutene in the olefinic stream.
11. The process of claim 10 wherein said hydrogenation catalyst includes at least one metal selected from Groups 8, 9, 10 and 11 of the Periodic Table of Elements.
12. The process of claim 11 wherein said at least one metal is selected from nickel, palladium, platinum, rhodium, ruthenium and mixtures thereof
13. The process of claim 11 wherein said hydrogenation catalyst also includes a porous inorganic oxide support.
14. The process of claim 13 wherein said porous inorganic oxide support is selected from silica, alumina, zirconia, titania, an aluminophosphate, a clay and a crystalline molecular sieve.
15. The process of claim 10 wherein said oligomerization catalyst includes a solid acid catalyst.

16. The process of claim 15 wherein said solid acid catalyst is selected from crystalline molecular sieves, substituted silicates, structured polyacids, acidified resins, mixed metal oxides and sulfated zirconia.
17. The process of claim 16 wherein said crystalline molecular sieve is selected from faujasites, ZSM-5, ZSM-11, ZSM-12, ZSM-22, ZSM-23, ZSM-34, ZSM-35, ZSM-48, ZSM-50, ZSM-57, mordenite and zeolite beta.
18. The process of claim 10 and further including passing the olefinic stream contacted in (b) to a recovery section to recover unconverted linear butenes.
19. The process of claim 10 wherein said hydrogenation conditions include a temperature of from about 20°C to about 180°C, a pressure of about 0 to about 500 psig (100 to 3550 kPaa), a liquid hourly space velocity of about 0.1 to about 50 hr⁻¹ and a hydrogen to butadiene molar ratio of about 1 to about 10.
20. The process of claim 10 wherein said oligomerization conditions include a temperature of about 20°C to about 180°C, a pressure of about 0 to about 500 psig (100 to 3550 kPaa) and a liquid hourly space velocity of about 0.1 to about 50 hr⁻¹.
21. The process of claim 10 wherein the contacting with the oligomerization catalyst is conducted after the contacting with the hydrogenation catalyst.
22. The process of claim 21 wherein the hydrogenation catalyst is contained in a first reactor and the oligomerization catalyst is contained in a second reactor downstream of the first reactor.
23. The process of claim 21 wherein the hydrogenation catalyst and the oligomerization catalyst are contained in a single reactor.